

XV.—*Notes on and Drawings of the Animals of various Indian Land Mollusca* (Pulmonifera).—By LIEUT.-COL. H. H. GODWIN-AUSTEN, F. R. S., F. Z. S., &c.

(Received July 15th;—Read Nov. 3rd, 1880.)

(With Plates X and XI.)

Previous to his appointment to the Yarkand Mission, Dr. F. Stoliczka had been working for some years at the animals of the Indian land Mollusca, and had enriched this Journal with many valuable papers. Among the numerous MSS. he left behind him in Calcutta, there were found, after his death, some very excellent drawings that had been made under his superintendence from the living animals; they had been drawn on scattered sheets of paper, and remarks on the colour and other characters of the soft parts had been made in pencil on the margins, which were fast becoming illegible. I, therefore, with the concurrence of Dr. J. Anderson, pasted these interesting drawings into a scrap-book* and copied into it, as well as I was able to decipher them, the names, localities, and remarks noted.

As it may be some years before many of these species are obtained again by any naturalist with the means or talent to correctly draw them, I have thought that lithographed copies published in this Journal would not only be preserving, but in a measure carrying out the work of so good an observer, and would be of use to those in India who are interested in the land-shells of the country. There is an immense amount of work to be done in this particular branch of Natural History. We know as yet very little of the relationship of the many species, especially among the *Zonitidæ* (Semper); the anatomy of most of them has never been examined, and, until this is done, or at least more careful descriptions and sketches of the outward form of the animals are made, our attempts at a satisfactory classification must fail.

I have to each species figured given Stoliczka's remarks and identifications in full, and added a few notes extracted from my field-book wherever I could do so, and I also distinguish a few identifications by Messrs. W. T. Blanford and Geoffroy Nevill.

The plates that will be given contain species of the family *Zonitidæ* variously assigned to the genera *Ariophanta*, *Hemiplecta*,† *Rhysota*, *Xesta*, and *Rotula*; and one plate has been required for the *Helicidæ* of such very different genera as *Plectopylis*, *Fruticicola*, &c; those of the genus *Macrochlamys*, I have also copied, but as I am engaged on a paper treating of this group more in detail, which I propose to send to the Zoological Society of London, the plate will I hope appear in the Journal of that Society.

* In the Library of the Indian Museum, Calcutta.

† *Oxytes*.

Genus ARIOPHANTA, Des Moulins.

Bull. Soc. Bord. III, p. 227, (Nov. 1829).

With plate giving three figures of shell and two of the animal from life; type *lævipes*, Müller, Bombay.

The description by Albers (*Die Heliceen*, p. 62, 1860) is as follows: "Testa sinistrorsa, umbilicata, tenuis, diaphana; anfractus ultimus angulatus vel carinatus; apertura obliqua, lunaris, peristoma simplex, acutum, margine columellari reflexo"; in the sub-genus, thus defined by shell alone, this writer places the following species:—

<i>himalayana</i> , Lea = <i>interrupta</i> , Bs.	Bengal.
<i>lævipes</i> , Müll.	Bombay.
<i>retrorsa</i> , Gould (<i>Hemiplecta</i> , Sect. E of Theobald)	Tavoy.
<i>janus</i> , Chem.	Malacca.
<i>rumphii</i> , v. d. Busch.	Java.

Adams adds to these:—

<i>ryssolemma</i> , Albers (? <i>Thyreus</i> , Bs.)	Java?
<i>trifasciata</i> , Chemn. = <i>lævipes</i> , var.	Malabar.

and he figures *lævipes*, quoting M. E. Gray, Fig. Moll. Anim. pl. 288, fig. 7, which is a trace of Des Moulins' original drawing (l. c.).

Mr. Geoffrey Nevill, in his Hand-List of Shells in the Indian Museum Calcutta, adds to the above:—

<i>laidlayana</i> , Bs.	Lower Bengal.
<i>kadapaensis</i> , Nevill,	Madras.

= *nicobarica*, Chemn. re-named, as it is not found in the Nicobar Islands.

<i>cysis</i> , Bs.	Nilgiris.
<i>thyreus</i> , Bs.	Nilgiris.
<i>intumescens</i> , W. T. Blf.	Bombay.
<i>immerita</i> , W. T. Blf. (in coll. Beddome)	South Canara.

near *interrupta*.

<i>cambojensis</i> , Reeve	Siam.
<i>regalis</i> , Bs.	Borneo.

= *vittata*, Adams and Reeve, (*vide* Adams. Gen. Moll. pl. lxxix, fig. 5, as *Nanina*).

<i>bajadera</i> , Pfr. = <i>ammonia</i> , Valenciennes	Bombay.
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Mr. William Theobald (Cat. Land and Freshwater Shells of Brit. India) includes—

<i>auris</i> , Pfr. (? <i>cysis</i> , Bs.)	Kundah Hills, Madras.
<i>cyclotrema</i> , Bs.	Sumeysar Hills, North of Tirhoot.

a true *Helix* belonging to the *delibrata*-group.

foveola for *foveata*, Pfr.

Java.

Mr. Edgar Smith agrees with me, on a comparison of the species in the British Museum, that this is *rumphi*, Mus. Cuming.

saccata, Pfr.

Tavoy.

and this is only the young of *retrorsa*, Mus. Cum.

Dr. C. Semper (Reis. Arch. Philip. p. 50, 1870), on the character of the horn above the tail-gland and foot, places one sinistral species (*rumphi*, v. d. Busch.) and the following dextral shells in the sub-genus:—

martini, Pfr.

Sumatra.

nemorensis, Müll.

javanica, Lamark

Java.

raregutata, Mouss. (*Xesta*)

Adenare, near Timor.

striata, Gray (*Nanina*)

Singapur.

atrofusca, Albers.

Singapur.

It is very unlikely that these last six species from the islands of the Malay Archipelago have any very close relationship to the typical sinistral Bombay species *lavipes*, although the tail-gland does assimilate, and it would be better to keep them, as well as all the other species from the same region, separate for the present, as nothing is yet known of the anatomy of the Indian species. Only those purely Indian forms which I distinguish by antique type can be with certainty placed in this sub-genus.

Pfeiffer has also, besides typical forms and others (Zeits. 1855):—

ammonia, Valenciennes, (sp. in Brit. Mus.)

Habitat ?

regalis, Bs., (I do not consider should be included.)

Borneo.

sannio, Pfr.

Habitat ?

ampullarioides, Reeve (Mus. Taylor = *cysis*.)

Nilgiris.

linstedti, Pfr. (Mus. Cum.)

Malacca.

is closely allied to *rumphi*, but it is sharper keeled, and, if the latter should prove a true *Ariophanta*, it should also be included.

Des Moulins founded his genus on the animal of a specimen which had been sent to him alive from the island of Elephanta, Bombay, by M. Théophile Laterrade in March 1829. The mollusk lived some short time and two drawings of it were made. Previous to this the shell only had been described by Müller.

To M. Des Moulins, therefore, belongs all the credit of first noticing and distinguishing the very distinct and large group of Asiatic *Helices* possessing a mucous pore at the extremity of the foot, and for which group so characterized he proposed the title *PIEREPORÆ*, placing the Bombay shell in his sub-genus *Ariophanta*.

Dr. J. E. Gray four years afterwards, on the similar characters of another but very distinct species, created the genus *Nanina*, for Asiatic

Helices of this type, and his genus was adopted by Adams and others, although Thos. Hutton first, and Benson afterwards, had pointed out the distinction in the sub-genus *Macrochlamys*; I do not, therefore, see how in fairness and by all rules of nomenclature Mr. Gray's title can be adopted, as it has been, for the whole group (Indian and Malayan) of these Eastern Helices provided with a mucous pore which Des Moulins described so well and so accurately; the latter saw at once the important differences such an organ implied in the general anatomy of the animal and understood its great value in classification, and he shewed also its affinity in this respect to *Arion* by the title he gave it (*vide*, pp. 230, 235, where he gives in full the description of the animal, his remarks on which are well worthy of perusal).

H. (ARIOPHANTA) LÆVIPES, Müll., var. TRIFASCIATA, Chemn.

Pl. X, Fig. 3, 3a.

H. lævipes, Müller, Hist. Verm. 2, p. 22, no. 222.

„ ——— Gmelin, Syst. Nat. p. 3616, no. 13.

„ ——— Chemnitz, Conch. 9, t. 108, fig. 915, 916.

„ ——— sub-genus, *Helicelle*, 2^{me} group Aplostomes, 3^{me} Sect. rubannées.

„ ——— Férussac, Hist. Moll. pl. xcii, fig. 3 à 6.

„ ——— Férussac, Tabl. Syst. p. 41, no. 229.

Sub-genus *Ariophanta*, Des Moulins, var. *a.* all white, without bands, from Island of Elephanta; var. *b.* *c.* banded, from the same locality (only this banded var. *trifasciata* figured in the Conch. Ind. pl. cxxxi, fig. 4.)

The figures are taken from No. 57*a* and 57*b* of the MSS. drawings representing specimens from Bombay.

ARIOPHANTA INTERRUPTA, Bs., Pl. X, Fig. 1, 1a.

Helix interrupta, Bs. Zool. Jour. Vol. V, p. 461, (1834), from Sikrigalli and on the Jellinghy river (tributary of the Ganges).

= *Himalayana*, Lea.

These figures have been reproduced from No. 44 in MSS. in Ind. Mus. Library; the specimens from which the original drawings were made were obtained in the Botanical Gardens, Calcutta.

Benson's description of this last in above Journal applies to *H. lævipes*, but in his description of the animal, he says the excrements are "voided from an opening in the terminal and posterior part of the foot instead of from the *foramen commune*" he must here evidently be mistaking the mucous gland for the anal orifice, although on the previous page (460), describing the genus *Nanina*, he shews that they are distinct openings.

H. ——— Conch. Ind. Hanley, fig. 3, plate xxvii. Specimens from Faqirabunda, Jessore District, are thus described in my note-book—"The animal being of a pink colour the same tint is given to the shell, while black mottlings shew through the body whorl. The head is dark-coloured up to a well defined black line (extending from posterior part of the neck to below the oral tentacles), thence light-coloured with a pink tinge, which

is more intense near the extremity of the foot The mucous gland has the form of a long slit with a very small lobe above."

HELIX (ARIOPHANTA) LAIDLAYANA, Bs., Pl. X, Fig. 2.

Ann. Nat. Hist. Ser. 2, Vol. 18, (1856) p. 253.

The figure is a copy of fig. 30 of MSS. drawing of a specimen from Manbhūm.

Helix laidlayana, Bs. Hanley, Conch. Ind. Pl. lviii, fig. 3, 4, 5: figure 4, from Cuttack would appear to be a different species from fig. 3, Orissa, which agrees with the original description, fig. 5.

H. (ARIOPHANTA) INTUMESCENS, W. T. Blf. Pl. X, Fig. 4.

J. A. S. B. 1866, p. 33, type from Mahableshwar, Western Ghats of Hindustan.

The figure is from fig. 17 of MSS. drawings and bears the following remark "*N. Canarica* from Fairbank" [Stoliczka].

Mr. Blanford writing of the animal and comparing it with *bajadera* says—"The animals also shew a difference in colour, that of *intumescens* is uniformly, so far as I have seen, dark cinerous, while that of *bajadera* is much lighter, but very variable. The latter shell is found mostly on shrubs, the former on the ground, and while *intumescens* has as yet only been found at Mahableshwar 4,500 feet above the sea, *bajadera* (which is rare at Mahableshwar) abounds on the equally or nearly equally high hills of Singhur and Poorundhur, and along the summit of the Western Ghats at about 2000 feet. It abounds at Khandalla at the top of the Bore Ghat."

Genus HEMIPLECTA, Albers.

Die Heliceen, p. 60, (1850).

Founded on the shell alone; type *humpfreysiana*, Lea, from Singapur.

"Testa supra granulosa vel decussatim striata; subtus polita, anfractus ultimus plus minusve angulatus vel carinatus."

Albers gives for the distribution of the species of this group the large islands of the Malay Archipelago, Java and the Philippines, New Ireland, &c.; only one species *labiata* (= *monticola*, Hutton) being from India, and that not agreeing with the description, the last whorl being well rounded. The two characters given would embrace a vast number of species having a much wider geographical range, and I should be inclined to restrict it to the Malay region and not to include any of the Indian forms, until other characters in common can be found after examination of the animals.

To Albers' list, Adams added, it is difficult to say why, several other species, among them *ligulata*, *semirugata*, and *tranquebarica*, shells widely differing in their very globose form from the generic description. Semper does not follow Albers, but places many of the species under

Rhysota, on the character of the odontophore ; these I have marked with an asterisk.

Albers refers the following species to *Hemiplecta* :—

* <i>bullæ</i> , Pfr. (<i>Rhysota</i> , Albers)	Luzon.
<i>fulvida</i> , Pfr.	Mindanao.
<i>biamensis</i> , Mouss.	Java.
<i>halata</i> , Mouss.	Java.
<i>rufa</i> , Less.	New Ireland.
<i>xanthotricha</i> , Pfr.	Guimares Is. and Negros.
* <i>setigera</i> , Sow.	Luzon.
* <i>gummata</i> , Sow.	Luzon.
<i>theodori</i> , Phil.	Mergui.
<i>bataviana</i> , v. d. Busch.	Java.
<i>centralis</i> , Mouss.	Java.
<i>cuvieriana</i> , Lea	Luzon.
<i>novæ-hiberniæ</i> , Quoy.	New Ireland.
<i>humphreysiana</i> , Sea	Singapur.
— var. <i>gemina</i> , v. d. Busch.	Java.
? <i>labiata</i> , Pfr.	Landour.
<i>semigranosa</i> , Sow.	Philippines.
<i>panayensis</i> , Brod.	Panay, do.
* <i>semiglobosa</i> , Pfr.	Samar, do.
Adams gives some others, three of which are Indian :—	
<i>blainvilliana</i> , Lea.	
<i>conoidalis</i> , Adams and Reeve	Mindoro.
<i>densa</i> , Adams and Reeve	Philippines.
? <i>ligulata</i> , Férus.	Bengal.
<i>limaënsis</i> , Mouss.	
<i>lurida</i> , Gould	Feejee.
<i>rubricata</i> , Gould	Feejee.
<i>rufescens</i> , Gratel.	Madagascar ?
? <i>semirugata</i> , Beck.	Bengal.
<i>steursii</i> , Shuttl.	Amboina.
? <i>tranquebaricha</i> , Fabr.	India.
<i>velutina</i> , Sow. = <i>xanthotricha</i> , Pfr.	Philippines.
Theobald has included a large number of Indian species in this subgenus, with forms so varied he subdivided it into 5 sections ; he does not give the characters, but notes the typical species in each (<i>vide</i> Suppl. Index, Conch. Indica).	
Nevill in his Hand-List makes it much more circumscribed and admits	
<i>distincta</i> , Pfr.	Saigon.
<i>neptunus</i> , Pfr.	Cambodia.

* <i>cymatium</i> , Bs.	Penang.
<i>sylvicola</i> , W. Blf. MSS.	Naga Hills.
<i>basileus</i> , Bs.	Annamullys.
<i>beddomei</i> , Blf.	Travancore.
<i>basilessa</i> , Bs.	Annamullys.
? <i>undosa</i> , W. Blf.	Mandalay.
<i>chenui</i> , Pfr.	Ceylon.
† <i>oxytes</i> , Bs.	Khasi Hills.
† <i>cycloplax</i> , Bs.	Do.
? † <i>castor</i> , Theobald	Do.
? † <i>pollux</i> , Theobald	Do.
? † <i>blanfordi</i> , Theobald	Darjiling.
<i>orobia</i> , Bs.	Do.

Genus OXYTES, Pfeiffer.

Zeits. 1855, p. 188 [Without description.]

1. *Nanina oxytes*, Bs. (type.)2. *thyreus*, Bs.is a true *Ariophanta*.3. *avus*, Pfr. ?

sinistral and it is difficult to understand on what grounds it is placed here.

4. *pallasiana*, Pfr. ?This sub-genus would be the same as *Hemiplecta* (Sec. D) of Theobald (l. c. p. 22): who places therein:—*basilessa*, Bs.

Travancore.

this should not be included. I do not recognize any resemblance even in form of the shell.

blanfordi, Theob.

Darjiling.

castor, Theob.

Khasi.

— var. *a. cherraensis*, W. Blf.

Do.

cycloplax, Bs.

Darjiling.

oxytes, Bs.

Khasi.

pollux, Theob.

Khasi.

HEMIPLECTA OROBIA, Bs., Pl. XI, Figs. 1 and 1a.

No locality given.

HELIX (HEMIPLECTA ?) LIGULATA, Fér., Pl. XI, Fig. 3.

No locality given.

Vide Nevill's Hand-List (1878), p. 50, No. 284, as *Xesta*? his notes on the animal are taken from this drawing. Madras ranging to Bhagulpur and Patna. (H. H. G.-A.)

* Placed in *Rhysota* by Stoliczka, J. A. S. B. 1878, p. 11.† Sub-genus *Oxytes*, Pfr. (see further on) forms a very recognizable group.

HELIX (OXYTES) OXYTES, Benson, Pl. XI, Fig. 2.

"No projection above the gland which is rather small; sole broadly margined, and with a double line," (W. T. B.) Nevill's Hand-List (1878) p. 47, No. 261.

I would call attention in this drawing to the close contiguity of the base of the eye-tentacles.

HELIX (OXYTES) POLLUX?, Theobald, Pl. XI, Fig. 4.

"Cherra Poonjee from Godwin-Austen" [Stoliczka].

"Animal of a pale light yellowish ochre. Head rather darker, eye pedicels long and rather thick at the base. Extremity of foot and under part of it very pale, short, flat and rounded, the mucous gland has a very small lobe above it.

"I found this shell very abundant on the limestone in the forest below Nongkulang in the West Khasi Hills, and it ranges westward to the Garo Hills following the band of the Nummulitic rocks. The very peculiar thick shape and drooping form of the tentacles is to be noted in the drawing, their bases adjacent as in *H. oxytes*." (H. H. G.-A.)

"A small lobe above the mucous pore; margins of mantle not produced over the edge of the shell, sole of foot narrowly margined." (W. T. B.) Nevill's Hand-List, p. 48, No. 264.

EXPLANATION OF THE PLATES.

Plate X.

- Fig. 1, 1a. *Helix (Ariophanta) interrupta*, Bs.
 Fig. 2. ——— ——— *laidlayana*, Bs.
 Fig. 3. ——— ——— *lævipes*, Müller, var. *trifasciata*.
 Fig. 4. ——— ——— *intumescens*, W. T. Blf.

Plate XI.

- Fig. 1, 1a. *Hemiplecta orobia*, Benson.
 Fig. 2. *Helix (Oxytes) oxytes*, Benson.
 Fig. 8. *Helix (Hemiplecta?) ligulata*, Fér.
 Fig. 4. *Helix (Oxytes) pollux?*, Theob.

Fig 1.

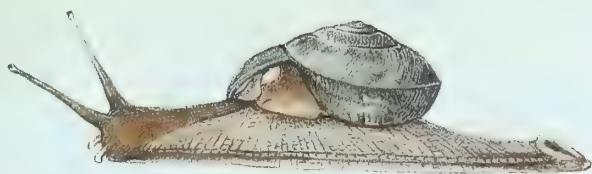


Fig 1^a



Fig 2

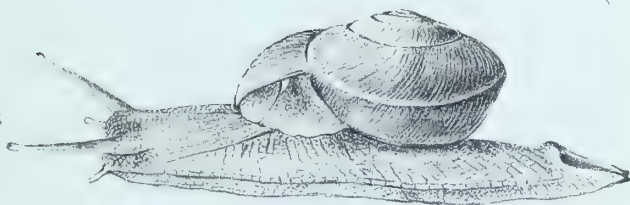


Fig 3.

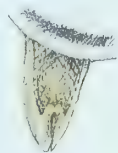
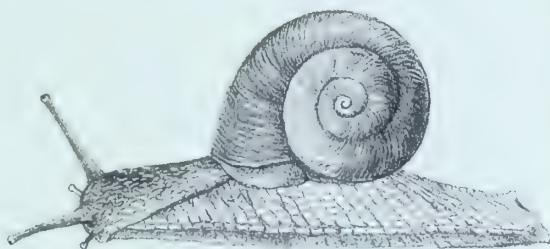


Fig 4



INDIAN ARIOPHANTA.

Fig 1



Fig 1a

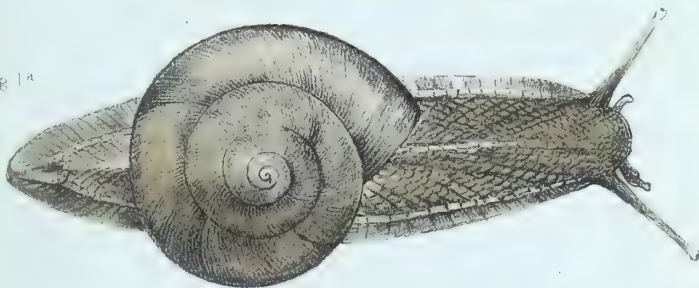


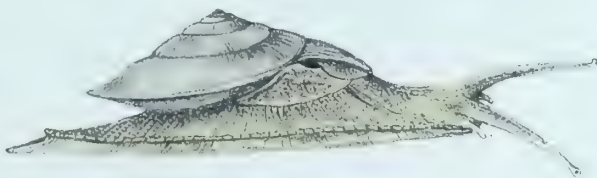
Fig 2



Fig 3



Fig 4



INDIAN MAMMALS, ETC.